

CLAIMS

We claim:

1. A liquid crystal display for a vehicle comprising:
  - a liquid crystal display panel;
  - a circuit board for mounting circuit elements including a liquid crystal driver;
  - a temperature sensor mounted on the circuit board; and
  - a control circuit, mounted on the circuit board, for controlling liquid crystal drive voltage based on temperature detected by the temperature sensor,
    - the liquid crystal display panel and the circuit board being placed one upon the other in a meter housing having a substantially closed space therein with a predetermined space therebetween, wherein
      - the display further comprises a heat collection panel exposed to surround the screen of the liquid crystal display panel.
2. The liquid crystal display for a vehicle according to claim 1, wherein the heat collection panel is mounted to the liquid crystal display panel through an adiabatic member.
3. The liquid crystal display for a vehicle according to claim 1, wherein the circuit board is inclined when the liquid crystal display for vehicle is properly mounted to a vehicle and the temperature sensor is installed at a high position above the inclined circuit board.

4. The liquid crystal display for a vehicle according to claim 1, wherein the temperature sensor is a thermistor.

5. The liquid crystal display for a vehicle according to claim 1, wherein the liquid crystal display is held in place by a liquid crystal holder, the liquid crystal holder being separated from the circuit board by the predetermined space, and held upright on the circuit board by leg portions extending downward from of the liquid crystal display holder to the circuit board.

6. The liquid crystal display for a vehicle according to claim 1, wherein the liquid crystal display panel and the circuit board are parallel to one another.

7. The liquid crystal display for a vehicle according to claim 1, wherein the control circuit further comprises:

a function storage portion for storing a function representing the relationship between the temperature of the liquid crystal display panel and the optimum drive voltage;

a compensation temperature storage portion for storing a compensation temperature for compensating for a difference between the detection temperature of the temperature sensor and the temperature of the liquid crystal display panel; and

a drive voltage decision portion for determining LCD drive voltage based on the function and the temperature of the liquid crystal display panel,

the drive voltage decision portion represents the temperature of the liquid crystal display panel by the detection temperature until the detection temperature exceeds a predetermined reference temperature, and represents the temperature of the liquid crystal display panel by the total of the detection temperature and the compensation temperature when the detection temperature exceeds the reference temperature.

8. The liquid crystal display for a vehicle according to claim 3, wherein the temperature sensor is installed at a high position in the predetermined space between the meter housing and the circuit board.

9. The liquid crystal display for a vehicle according to claim 7, wherein the predetermined reference temperature is 45°C.

10. A liquid crystal display comprising:  
a liquid crystal display panel;  
a circuit board for mounting circuit elements including a liquid crystal driver;  
a temperature sensor mounted on the circuit board; and  
a control circuit, mounted on the circuit board, for controlling liquid crystal drive voltage based on temperature detected by the temperature sensor,

the liquid crystal display panel and the circuit board being placed one upon the other in a meter housing having a substantially closed space therein with a predetermined space therebetween, wherein

the display further comprises a heat collection panel exposed to surround the screen of the liquid crystal display panel, and

the control circuit further comprises an adder circuit for adding a compensation temperature to the temperature detected by the temperature sensor, and outputting the sum of these temperatures to the liquid crystal driver when the temperature detected by the temperature sensor exceeds a predetermined reference temperature.

11. The liquid crystal display according to claim 10, wherein the heat collection panel is mounted to the liquid crystal display panel through an adiabatic member.

12. The liquid crystal display according to claim 10, wherein the circuit board is inclined when the liquid crystal display for vehicle is properly mounted to a vehicle and the temperature sensor is installed at a high position above the inclined circuit board.

13. The liquid crystal display according to claim 10, wherein the temperature sensor is a thermistor.

14. The liquid crystal display according to claim 10, wherein the liquid crystal display panel and the circuit board are parallel to one another.

15. The liquid crystal display according to claim 10, wherein the liquid crystal display is held in place by a liquid crystal holder, the liquid crystal holder being separated from the circuit board by the predetermined space, and held upright on the circuit board by leg portions extending downward from of the liquid crystal display holder to the circuit board.

16. The liquid crystal display according to claim 10, wherein the control circuit further comprises:

a function storage portion for storing a function representing the relationship between the temperature of the liquid crystal display panel and the optimum drive voltage;

a compensation temperature storage portion for storing the compensation temperature, the compensation temperature compensating for a difference between the detection temperature of the temperature sensor and the temperature of the liquid crystal display panel; and

a drive voltage decision portion for determining LCD drive voltage based on the function and the temperature of the liquid crystal display panel,

the drive voltage decision portion represents the temperature of the liquid crystal display panel by the detection temperature until the detection temperature exceeds the predetermined reference temperature, and represents the temperature of the

liquid crystal display panel by the total of the detection temperature and the compensation temperature when the detection temperature exceeds the reference temperature.

17. The liquid crystal display according to claim 12, wherein the temperature sensor is installed in a high position in the predetermined space between the meter housing and the circuit board.

18. The liquid crystal display according to claim 16, wherein the predetermined reference temperature is 45°C.